UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/725,470	12/03/2003	Kenichi Ono	246078US2	4062

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ART UNIT	PAPER NUMBER
2861	

DATE MAILED: 12/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

		Application No.	Applicant(s)
Office Action Summary		10/725,470	ONO, KENICHI
		Examiner	Art Unit	
		Hai C. Pham	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6, 8-10, 13-23, 25-27, 30-32 and 34-36* is/are rejected.

7)☒ Claim(s) *7, 11, 12, 24, 28, 29, 33, 37 and 38* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☒ All   b)☐ Some * c)☐ None of:

         1.☒ Certified copies of the priority documents have been received.

         2.☐ Certified copies of the priority documents have been received in Application No. _____.

         3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
     Paper No(s)/Mail Date <u>03/02/04, 04/30/04</u> *(twice)*

4)☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims 1-6, 8-10, 13-23, 25-27, 30-32, 34-36 are rejected under 35 U.S.C. 103(a)

as being unpatentable over Sato et al. (U.S. 5,926,616) in view of Kawamura et al. (U.S.

4,926,268).

Sato et al. discloses a printing apparatus comprising a data buffer unit (input

buffer 2) that buffers input image data, the sub-scan resolution of which is 2/n (n: an odd

integer greater than or equal to 3) times a sub-scan print resolution (I.e., the input image

data of 200 dpi being converted into a sub-scan print resolution of 300 dpi).

Sato fails to teach a data transform unit that transforms the input binary data into

output multi-level data of the sub-scan print resolution, and a light beam modulation unit

that modulates radiant energy of a light beam in accordance with the output multi-level

data (claims 1, 13, 17, 21, 30), data transform unit comprises a data transform table that

relates the input binary image data of 2 input scan lines to the output multi-level data of

"n" output scan lines (claims 6, 10, 23, 27, 32, 36), a deflection unit (claim 14).

Kawamura et al. discloses an image processing apparatus including a multi-level

processor (4) to convert a binary image data or bi-level image data (e.g., 1-bit) into a

multi-level (e.g., 8-bit) image data, and a PWM circuit (5) for processing the multi-level

image data output from the multi-level processor to generate a pulsewidth modulated

signal (39) to be inputted to the laser driver (40) driving the laser light source (41) (Figs.

1-3). Kawamura et al. further teaches data transform unit comprising a data transform

table (LUT 113) that relates the input binary image data of 2 input scan lines to the

output multi-level data (col. 8, lines 1-37). Kawamura et al. also teaches the printing

apparatus including a polygon mirror (43) for scanning the light beam in a raster

scanning method to form a latent image on the photosensitive drum (45).

It would have been obvious at the time the invention was made to a person

having ordinary skill in the art to incorporate the multi-level processor and the PWM

circuit into the device of Sato et al. as taught by Kawamura et al. for the purpose of

controlling the density of the output image data to reproduce a higher quality image.

Sato et al. further teaches:

- said light beam modulation unit forms a dot (e.g., basic dot 9, Fig. 22), the

    barycenter of which lies on a scan line (e.g., line L1) corresponding to the sub-

    scan input resolution of the binary image data, by superposing light beams lying

    on adjacent (n+1)/2 scan lines corresponding to the sub-scan print resolution

    (e.g., additional dot 10 on line L2 such that the difference between the width of

    the basic dot and the width of the additional dot is equal to the print resolution)

    (col. 10, lines 15-18 and 58-65) (Fig. 22);

- said light beam modulation unit adjusts the radiant energy of the light beam lying

    on one of the adjacent (n+1)/2 scan lines on one end, to substantially 1/2 times

the radiant energy of the light beams lying on other scan lines (col. 9, lines 42-

52) (Fig. 18);

- said light beam modulation unit forms 2 dots, each having the barycenter lying on

  one of 2 scan lines corresponding to the sub-scan resolution of the binary image

  data, by selectively superposing light beams on "n" adjacent scan lines

  separated at a distance corresponding to the sub-scan print resolution (col. 10,

  lines 15-18);

- said data transform unit transforms the input binary image data of 2 input scan

  lines into the output multi-level data of "n" output scan lines (e.g., the two basic

  dots 10 on line L1 and the additional dot 9 on line L2) (Fig. 18);

- said data buffer unit buffers input binary data, the sub-scan resolution and the

  main-scan resolution of which are 2/n (n: an odd integer greater than or equal to

  3) times the sub-scan print resolution and a main-scan print resolution,

  respectively, and said data transform unit transforms the input binary data into

  output multi-level data of the sub-scan print resolution and a main-scan print

  resolution (col. 10, lines 57-65);

- said data transform unit transforms the input binary image data of a 2.times.2

  matrix corresponding to 2 pixels in the main scan directions and 2 input scan

  lines into the output multi-level data of a "nxn" matrix corresponding to "n" pixels

  in the main scan directions and "n" output scan lines (the printed dots 9 and 10

  having 300 dpi in the main scanning direction and disposed on the consecutive

  three scan lines, e.g., head data output in Fig. 1);

- a plurality of light sources (a plurality of LEDs) (Figs. 15A-15B) that radiates light

  beams for scanning a photosensitive unit (not shown).

Allowable Subject Matter

3.   Claims 7, 11-12, 24, 28-29, 33 and 37-38 are objected to as being dependent

upon a rejected base claim, but would be allowable if rewritten in independent form

including all of the limitations of the base claim and any intervening claims.

4.   The following is a statement of reasons for the indication of allowable subject

matter: the primary reason for the indication of the allowability of claims 7, 24, 33 is the

inclusion therein, in combination as currently claimed, of the limitation "said data

transform unit sets the output multi-level data of upper $(n-1)/2$ output scan lines equal to

the input binary data of an upper input scan line, the output multi-level data of lower $(n-1)/2$ output scan lines equal to the input binary data of a lower input scan line, and the

output multi-level data of a middle output scan line is based on the input binary data of

the upper input scan line and the input binary data of the lower input scan line", which is

not found taught by the prior art of record considered alone or in combination.

The primary reason for the indication of the allowability of claims 11, 28, 37 is the

inclusion therein, in combination as currently claimed, of the limitation "said data

transform unit divides the "nxn" matrix with the middle pixel array and the middle scan

line into four "$(n-1)/2$" x "$(n-1)/2$" sub-matrixes, and determines the output multi-level

data of the four "$(n-1)/2$" x "$(n-1)/2$" sub-matrixes based on the corresponding respective

input binary data; the output multi-level data of the upper "$(n-1)/2$" items and the output

multi-level data of the lower "(n-1)/2" items in the middle pixel array are based on 2

upper items and 2 lower items, respectively, in the 2x2 matrix; the output multi-level

data of the left "(n-1)/2" items and the output multi-level data of the right "(n-1)/2" items

in the middle scan line are based on 2 left items and 2 right items, respectively, in the

2x2 matrix; and the output multi-level data of the cross point of the middle pixel array

and the middle scan line are based on 4 items in the 2x2 matrix", which is not found

taught by the prior art of record considered alone or in combination.

Claims 12, 29 and 38 are allowable because of their dependency from claims 11,

28 and 37 above.

Contact Information

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Hai C. Pham whose telephone number is (571) 272-

2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, David L. Talbott can be reached on (571) 272-1934. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

HAI PHAM
PRIMARY EXAMINER
December 8, 2005